

Regulator and Valve Selection Guide

Valve and Regulator Recommendations for source and distribution application

This guide is a reference guide to help customers determine an appropriate AP Tech valve and regulator to be used in process gas systems. Before selecting a product, please make sure to read through this guide. For information and specifications related to the specific model, please refer to the catalog data sheet.

Precautions for selection

The guide's general recommendations are based upon typical applications from material point of view.

Some series are not available depending on the regulations in different countries so the selection should be made complying with the regulations in the countries where the product will be used.

In Japan since using compression fittings for toxic gas is prohibited, AP/AZ series should be used for toxic gas.

The proper regulator and valve selection can be significantly affected by parameters such as system design, flow duration, frequency of use, ambient conditions and outlet pressure. Please consult SMC for a specific recommendation beyond the scope of this document or if any doubt exists. It is important to understand that one may follow this guide's recommendation, yet have a failure due to a parameter specific to the given application, as noted. Restated, one may achieve higher or lower flow capacities than stipulated in this guide due to the parameters and conditions of a specific application and system design.

- **Source valves** are those on the upstream side of the pressure regulator in the source gas cabinet or bulk delivery system.
- **Distribution valves** are those on the downstream side of the pressure regulator in the source gas cabinet or bulk delivery system and used anywhere downstream of the regulator (s) for cylinder applications at point of use (POU) in valve manifold boxes (VMBs) and process tools.
- **Source regulators** are those used in the source gas cabinet or bulk delivery system.
- **Distribution regulators** are those used at point of use (POU) in valve manifold boxes (VMBs) and process tools. Recommendations are based on typical usage. Operating practices at a specific facility may require a different component selection.
- It is assumed that non-liquefied gas cylinders are switched over to a new cylinder when the pressure drops to 150 to 250 psig (1.0 to 1.7 MPa). Therefore, maximum recommended flow rates for source regulators and source valves assume 150 to 250 psig (1.0 to 1.7 MPa) inlet pressure for this gas.
- It is assumed that the cylinder pressure for liquefied gas systems is maintained at or above the vapor pressure at 16 °C. It is assumed that cylinders are switched over before the liquid is all vaporized into gas. Therefore, maximum recommended flow rates for **source regulators** are based on 16 °C vapor pressure at the regulator inlet for these gases.
- Absolute or very low positive pressure delivery bear close scrutiny. The AP1402TA delivers both sub-atmospheric and positive pressure (30 psig) equally well, whereas the AP1101 is strictly intended for sub-atmospheric pressure delivery (10 psig or less). If low flow and very low positive pressure delivery is desired, the AP1001 should be selected instead of the AP1101. The alternative is to select the AP1402TA which provides more flow capacity and the ability to delivery sub-atmospheric and positive pressure.
- The SHP option is for certain point of use applications in lieu of the SH option. The SHP designation provides Ni-Cr-Mo alloy internals comprised of the poppet and diaphragm, whereas the SH option includes the nozzle.
- If a source regulator is listed as ① and ②, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.
- Valve recommendations are based on typical cylinder pressures and delivery line pressures. Pressure drop across valves at low pressures may be excessive and required a different valve selection.
- Valve recommendations are for the process line isolation. Purge and vent valves are not addressed in this document but generally an AP3000, AP3650, or AP3540 valve will provide sufficient flow capability. The valve series recommended were purposely limited for the sake of brevity. The model number indicates the basic size and rating. For example, manually operated valves are noted as AP3650 but an AP3600 or AP3625 would also be appropriate and equivalent selections.
- Polyimide seats are recommended for nitrous oxide (N₂O) and for source applications for carbon dioxide (CO₂) with either continuous flow demand or flow rates in excess of 100 slpm.
- Heating may be required in the source manifold for some gases even when not stated due to duration of flow, ambient conditions, etc. When heating is recommended, appropriate heating method shall be selected depending on gas type. In general, the gas should be heated upstream of the pressure regulator.
- Distribution line pressure is assumed to be 60 psig (0.4 MPa) minimum or typical source pressure whichever is less. If the actual line pressure is higher, then higher flow rates than listed in this guideline can be obtained.

Caution

Since the product specified here is used under various operating conditions, its compatibility with fluid and specific equipment must be decided by the person who designs the equipment or decided its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product regardless of any recommendation.

Proper installation, operation and maintenance are also required to assure safe, trouble free performance.

Recommended Model Selection Table

Please read page 656 before selecting a product.

How to read model number listed as recommendation.

Example

Valve	Regulator						
AP3650	AP/AZ/AK1200	S	VS	HF	AP/AZ/1402T	S	A
①	①	②	③	④	①	②	⑤

① Series

AP/AZ/AK1200: 3 series are recommended (AP1200, AZ1200, AK1200).

Valve: Only typical series is shown as recommendation and other models with same specifications (operating pressure, Cv) are also recommended.

For example, other than AP3650, AP3600/3625/3657 are also recommended.

② Material

S: Stainless steel body as standard design.

SH: Stainless steel body with Ni-Cr-Mo alloy internals as it further improves corrosion resistance than S (standard design).

Either SH or SHP can be used with AP series regulators and SHP is used with AZ series regulators. (SHP provides Ni-Cr-Mo alloy internals comprised of the poppet and diaphragm, whereas SH includes the nozzle.)

Material of stainless steel body varies depending on series.

- AP series (except AP9000&9100) ... 316L SS secondary remelt
- AZ series and AP9000&9100 ... 316L SS
- AK series ... 316 SS

③ VS: Seat material is made of Polyimide. (Only for specific series)

No code: PCTFE as standard design.

④ Option (Only for specific series)

- HF: High flow
- FC: Force compensation
- HR: High inlet pressure

⑤ A: Delivery of sub-atmospheric pressure. (Only for specific series)

For more details, please refer to catalog.

AP

SL

AZ

AK

BP

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Acetylene* (C ₂ H ₂)	230	AP3000	25	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF
	280	AP3002	45	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP3650		AP4650		75	AP/AZ/AK1200S	
				AP3700		95	AP/AZ/AK1200S HF	
				AP3800			AZ/AK1300S	
Air	185	AP3000	90	AP3540	30	AP/AZ/AK1500S	30	AP/AZ/AK1000S
		AP3650		AP3650	100	AP1900S	50	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	200	AP/AZ/AK1400TS	150	AP/AZ/AK1400TS
		AP3650		AP4650	800	AP/AZ/AK1200S HR	400	AP/AZ/AK1200S
		AP3100		AP3800			600	AP/AZ/AK1200S HF
				AP3130	AP3700			AZ/AK1300S
475	AP3125	890	AP3800					
Ammonia (NH ₃)	250	AP3540	100	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	450	AP4540	225	AP4540	75	AP/AZ/AK1200S	60	AP/AZ/AK1400TS
		AP4650		AP4650	400	AP/AZ/AK1200S	125	AP/AZ/AK1200S
		AP3113		AP3700	600	AP/AZ/AK1200S HF	250	AP/AZ/AK1200S HF
		AP3125		AP3800	1100	AP9100S		AZ/AK1300S
						500	AP/AZ/AK1200S FC	
						1000	AP9100S	
Argon (Ar)	200	AP3000	80	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	100	AP1900S	25	AP/AZ/AK1000S HF
	350	AP3002	150	AP4540	300	AP1900S HF	50	AP/AZ/AK1400TS
		AP3650		AP4650	1500	AP/AZ/AK1200S HR	100	AP/AZ/AK1200S
		AP3130		AP3700			200	AP/AZ/AK1200S HF
		AP3125		AP3800			400	AZ/AK1300S
						1000	AP/AZ/AK1200S FC	
							AP9100S	

* 15 psig (0.1 MPa) maximum source regulator outlet pressure.

■ denotes heating required to achieve stated flow.

Recommended Model Selection Table

Please read page 656 before selecting a product.

Application		Valve				Regulator			
		Source applications		Distribution applications		Source applications		Distribution applications	
Process Gas	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	
		Arsine (AsH ₃)	140	AP3540	55	AP3540	5	AP/AZ/AK1500S	5
AP3650	AP3650			40		AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF	
240	AP4540		95	AP4540					
	AP4650			AP4650					
Arsine Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	15	AP/AZ/AK1500S	15	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP1900S		50	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	150	AP/AZ/AK1400TS	150	AP/AZ/AK1400TS	
		AP3650		AP4650					
Boron Trichloride (BCl ₃)	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	0.4	AP/AZ/AK1101SH	
		AP4650		AP4650			6	AP/AZ/AK1402TSA	
Boron Trichloride Mix (Nitrogen Balance)	185	AP3000	90	AP3540	15	AP/AZ/AK1500S	15	AP/AZ/AK1000S	
		AP3650		AP3650	60	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF	
	225	AP3002	160	AP4540			60	AP/AZ/AK1400TS	
		AP3650		AP4650					
Boron Trifluoride (BF ₃)	115	AP3000	60	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF	
	145	AP3002	100	AP4540			25	AP/AZ/AK1400TS	
		AP3650		AP4650					
Boron 11 Trifluoride (11BF ₃)	115	AP3000	60	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF	
	145	AP3002	100	AP4540			25	AP/AZ/AK1400TS	
		AP3650		AP4650					
Butadiene (C ₄ H ₆)	60	AP4540	60	AP4540	3	AP/AZ1500S	3	AP/AZ1000S	
		AP4625		AP4625	40	AP/AZ1400T	5	AP/AZ1000S HF	
n-butane (C ₄ H ₁₀)	60	AP4540	60	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP4625		AP4625	40	AP/AZ/AK1400T	5	AP/AZ/AK1000S HF	
Butene-1 (C ₄ H ₈)	35	AP3540	30	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF	
	65	AP4540	60	AP4540					
		AP4650		AP4650					
Carbon Dioxide (CO ₂)	500	AP3000	75	AP3540	3	AP/AZ/AK1500S	8	AP/AZ/AK1000S	
		AP3650		AP3650	75	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF	
		AP3002		AP4540	150	AP/AZ/AK1200S VS	40	AP/AZ/AK1400TS	
	700	AP3650	140	AP4650	500	① AP/AZ/AK1225S VS	100	AP/AZ/AK1200S	
		AP3113		AP3700		② AP/AZ/AK1200S VS HF	160	AP/AZ/AK1200S HF	
	2500	AP3125	750	AP3800	1000	① AP9030S VS		AZ/AK1300S	
						② AP9100S VS	325	AP/AZ/AK1200S FC	
Carbon Monoxide (CO)	185	AP3000	90	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	15	AP1900S	15	AP/AZ/AK1000S HF	
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS	
		AP3650		AP4650					
Carbonyl fluoride (COF ₂)	115	AP3000	60	AP3540	5	AP/AZ1500S	3	AP/AZ1000S	
		AP3625		AP3625	25	AP/AZ1400TS	10	AP/AZ1000S HF	
	200	AP3625	100	AP4540					
Chlorine (Cl ₂)	75	AP3540	50	AP3540	3	AP/AZ/AK1500SH	5	AP/AZ/AK1000SH	
		AP3650		AP3650	50	AP/AZ/AK1400TS	15	AP/AZ/AK1000SH HF	
	150	AP4540	100	AP4540	75	AP/AZ/AK1200SH	30	AP/AZ/AK1400TS	
		AP4650		AP4650	200	AP/AZ/AK1200SH HF	75	AP/AZ/AK1200SH	
	300	AP3113	400	AP3700			125	AP/AZ/AK1200SH HF	
		AP3125		AP3800				AZ/AK1300S	
Chlorine Trifluoride (ClF ₃)	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S	
		AP4650		AP4650			6	AP/AZ/AK1402TSA	
	185	AP3000	90	AP3540	5	AP1700S	10	AP/AZ/AK1000S	
		AP3650		AP3650	225	AP2700S	20	AP/AZ/AK1000S HF	
Dichlorosilane (SiH ₂ Cl ₂)	20	AP4540	20	AP4540	7	AP/AZ1402TSA	1	AP1001S	
		AP4650		AP4650			7	AP/AZ/AK1402TSA	

■ denotes heating required to achieve stated flow. Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

Recommended Model Selection Table

Please read page 656 before selecting a product.

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Diethyltelluride (Te(C ₂ H ₅) ₂)	70	AP3000	35	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		5		AP1900S
	85	AP3002	60	AP4540	25	AP/AZ/AK1400TS	25	AP/AZ/AK1400TS
AP3650		AP4650						
Vinylidene fluoride (C ₂ H ₂ F ₂)	140	AP3000	55	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3625		AP3625		50		AP/AZ/AK1400TS
	200	AP3625	100	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP4625						75
Dimethylsilane (C ₂ H ₆ Si)	14	AP4540	7	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650		50		AP/AZ/AK1400TS
	150	AP3700	75	AP3700	75	AP/AZ/AK1200S	75	AP/AZ/AK1200S
AP3800		AP3800						
Disilane (Si ₂ H ₆)	14	AP4540	7	AP4540	1	AP/AZ/AK1000S	1	AP/AZ/AK1000S
		AP4650		AP4650		7		AP/AZ/AK1402TSA
Ethylene (C ₂ H ₄)	380	AP3000	90	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	485	AP3002	160	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
AP3650		AP4650						75
Fluorine(F ₂)	10	AP3200	10	AP3200	Consult Factory		Consult Factory	
Fluorine Mixtures (10 %, 3.4 MPa) (Nitrogen Balance)	185	AP3000	90	AP3540	5	AP/AZ/AK1500SH	5	AP/AZ/AK1000SH
		AP3650		AP3650		25		AP/AZ/AK1400TS
	225	AP3002	160	AP4540			25	AP/AZ/AK1400TS
AP3650		AP4650						
Germane (GeH ₄)	10	AP3540	4	AP3540	1	AP/AZ/AK1000S	1	AP/AZ/AK1000S
		AP3650		AP3650		7		AP/AZ/AK1402TSA
	18	AP4540	7	AP4540				
AP4650		AP4650						
Germane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650		20		AP1900S
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS
AP3650		AP4650						
Halocarbon 12 (CCl ₂ F ₂)	55	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650		50		AP/AZ/AK1400TS
							50	AP/AZ/AK1400TS
Halocarbon 12B2 (CBr ₂ F ₂)	15	AP4540	15	AP4540	5	AP/AZ/AK1400TS	0.5	AP/AZ/AK1000S
		AP4650		AP4650				
Halocarbon 13 (CClF ₃)	140	AP3000	40	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	170	AP3002	70	AP4540			50	AP/AZ/AK1400TS
AP3650		AP4650						
Halocarbon 13B1 (CBrF ₃)	110	AP3540	35	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	190	AP4540	65	AP4540			50	AP/AZ/AK1400TS
AP4650		AP4650						
Halocarbon 14 (CF ₄)	10	AP3000	50	AP3540	10	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650		40		AP1900S
	200	AP3002	100	AP4540	80	AP1900S HF	30	AP/AZ/AK1400TS
		AP3650		AP4650		500		AP/AZ/AK1200S HR
	600	AP3130	500	AP3700			100	AP/AZ/AK1200S HF
		AP3125		AP3800				
						250	AP/AZ/AK1200S FC	
						500	AP9100S	
Halocarbon 21 (CHCl ₂ F)	25	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S
		AP4650		AP4650				
Halocarbon 23 (CHF ₃)	115	AP3000	145	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	140	AP3002	250	AP4540			50	AP/AZ/AK1400TS
AP3650		AP4650						
Halocarbon 32 (CH ₂ F ₂)	140	AP3000	55	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	175	AP3002	100	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
AP3650		AP4650						75

AP
SL
AZ
AK
BP

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Recommended Model Selection Table

Please read page 656 before selecting a product.

Application	Valve				Regulator					
	Source applications		Distribution applications		Source applications		Distribution applications			
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation		
Halocarbon 114 (C ₂ Cl ₂ F ₄)	30	AP4540	25	AP4540	7	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S		
		AP4650		AP4650		1		AP/AZ/AK1000S		
Halocarbon 115 (C ₂ ClF ₅)	60	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4650		AP4650		50		AP/AZ/AK1000S HF		
						75		AP/AZ/AK1200S	50	AP/AZ/AK1400TS
Halocarbon 116 (C ₂ F ₆)	60	AP3000	40	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	100	AP3002	80	AP4540	75	AP/AZ/AK1200S	25	AP/AZ/AK1400TS		
		AP3650		AP4650		125		AP/AZ/AK1200S HF	50	AP/AZ/AK1200S
	275	AP3113	400	AP3700				90	AP/AZ/AK1200S HF	
		AP3125		AP3800				450	AZ/AK1300	
Halocarbon 125 (C ₂ HF ₃)	180	AP4540	70	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4650		AP4650		25		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
						75		AP/AZ/AK1200S	25	AP/AZ/AK1400TS
Halocarbon 134A (C ₂ H ₂ F ₄)	55	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4650		AP4650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
		AP3100		AP3800		75		AP/AZ/AK1200S	50	AP/AZ/AK1400TS
	350	AP3700	230	AP3700			75	AP/AZ/AK1200S		
Halocarbon R218 (C ₃ F ₈)	35	AP3540	20	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	60	AP4540	40	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS		
Halocarbon C318 (C ₄ F ₈)	25	AP4540	20	AP4540	6	AP/AZ/AK1402TSA	1	AP/AZ/AK1101S		
		AP4650		AP4650					6	AP/AZ/AK1402TSA
Helium (He)	750	AP3000	250	AP3540	125	AP/AZ/AK1500S	65	AP/AZ/AK1000S		
		AP3650		AP3650		500		AP1900S	125	AP/AZ/AK1000S HF
	1000	AP3002	450	AP4540	625	AP1900S HF	275	AP/AZ/AK1400TS		
	2500	AP3650	2500	AP4650	2000	AP/AZ/AK1200S HR	625	AP/AZ/AK1200S		
		AP3130		AP3700		900		AP/AZ/AK1200S HF		
	AP3125	AP3800					AZ/AK1300			
Hexafluoropropane (C ₃ H ₂ F ₆)	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	6	AP/AZ/AK1402TSA		
Hexafluoropropylene (C ₃ F ₆)	60	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4625		AP4625		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
						75		AP/AZ/AK1200S	50	AP/AZ/AK1400TS
Hydrogen (H ₂)	800	AP3000	300	AP3540	125	AP/AZ/AK1500S	65	AP/AZ/AK1000S		
		AP3650		AP3650		500		AP1900S	125	AP/AZ/AK1000S HF
	1600	AP3002	600	AP4540	625	AP1900S HF	275	AP/AZ/AK1400TS		
		AP3650		AP4650		900		AP2700S	625	AP/AZ/AK1200S
	3000	AP3130	3000	AP3700	1200	AP/AZ/AK1200S HR	900	AP/AZ/AK1200S HF		
		AP3125		AP3800						AZ/AK1300S
							1200	AP/AZ/AK1200S FC		
							3000	AP9100S		
Hydrogen Bromide (HBr)	155	AP3000	55	AP3540	1	AP/AZ/AK1500SH	1	AP/AZ/AK1000SH		
		AP3650		AP3650		30		AP/AZ/AK1400TS	2	AP/AZ/AK1000S HF
	190	AP3002	95	AP4540	50	AP/AZ/AK1200SH	30	AP/AZ/AK1400TS		
Hydrogen Chloride (HCl)	350	AP3000	75	AP3540	2	AP/AZ/AK1500SH	8	AP/AZ/AK1000SH		
		AP3650		AP3650		90		AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	500	AP3002	150	AP4540	150	AP/AZ/AK1200SH	40	AP/AZ/AK1400TS		
		AP3650		AP4650		600		① AP1225SH	85	AP/AZ/AK1200SH
	2000	AP3113	850	AP3700	2000	② AP1210SH HF	160	AP/AZ/AK1200S HF		
		AP3125		AP3800		① AP9030S		AZ/AK1300S		
					② AP9110S	300	AP/AZ/AK1200S FC			
						800	AP9100S			

■ denotes heating required to achieve stated flow.
Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

Recommended Model Selection Table

Please read page 656 before selecting a product.

Application Process Gas	Valve				Regulator					
	Source applications		Distribution applications		Source applications		Distribution applications			
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation		
Hydrogen Chloride Mixtures (Nitrogen Balance)	210	AP3000	105	AP3540	10	AP/AZ/AK1500SH	10	AP/AZ/AK1000SH		
		AP3650		AP3540		20		AP1900SH	20	AP/AZ/AK1000SH HF
	265	AP3002	190	AP4540	40	AP/AZ/AK1400TS	40	AP/AZ/AK1400TS		
AP3650		AP4650								
Hydrogen Fluoride (HF)	20	AP4540	20	AP4540	5	AP/AZ/AK1402TSA	5	AP/AZ/AK1402TSA		
		AP4650		AP4650						
Hydrogen Selenide (H ₂ Se)	125	AP3540	55	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S		
		AP3650		AP3650		40		AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	215	AP4540	95	AP4540			40	AP/AZ/AK1400TS		
AP4650		AP4650								
Hydrogen Selenide Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S		
		AP3650		AP3650		20		AP1900S	20	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS		
AP3650		AP4650								
Hydrogen Sulfide (H ₂ S)	210	AP3000	80	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S		
		AP3650		AP3650		40		AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	260	AP3002	140	AP4540			40	AP/AZ/AK1400TS		
AP3650		AP4650								
Krypton (Kr)	105	AP3000	50	AP3540	20	AP/AZ/AK1500S	20	AP/AZ/AK1000S		
		AP3650		AP3650		60		AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	130	AP3002	90	AP4540			60	AP/AZ/AK1400TS		
AP3650		AP4650								
Methane (CH ₄)	245	AP3000	120	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S		
		AP3650		AP3650		20		AP1900S	20	AP/AZ/AK1000S HF
	295	AP3002	210	AP4540	40	AP/AZ/AK1400TS	40	AP/AZ/AK1400TS		
AP3650		AP4650								
Methanol (CH ₃ OH)	40	AP3540	25	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	70	AP4540	40	AP4540						
AP4650		AP4650								
Methyl bromide (CH ₃ Br)	25	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	5	AP/AZ/AK1402TSA		
		AP4625		AP4625						
Methyl Chloride (CH ₃ Cl)	60	AP4540	45	AP4540	1	AP/AZ/AK1000S	10	AP/AZ/AK1402TSA		
		AP4650		AP4650		10		AP/AZ/AK1402TSA		
Methylsilane (CH ₃ SiH ₃)	200	AP3540	70	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	350	AP4540	120	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS		
AP4650		AP4650		75		AP/AZ/AK1200S		75	AP/AZ/AK1200S	
Methyl Fluoride (CH ₃ F)	400	AP3000	120	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	490	AP3002	200	AP4540			50	AP/AZ/AK1400TS		
AP3650		AP4650								
Neon (Ne)	215	AP3000	110	AP3540	20	AP/AZ/AK1500S	20	AP/AZ/AK1000S		
		AP3650		AP3650		40		AP1900S	40	AP/AZ/AK1000S HF
	260	AP3002	190	AP4540	300	AP/AZ/AK1200S HF	100	AP/AZ/AK1400TS		
AP3650		AP4650								
Nitrogen (N ₂)	250	AP3000	100	AP3540	50	AP/AZ/AK1500S	25	AP/AZ/AK1000S		
		AP3650		AP3650		200		AP1900S	50	AP/AZ/AK1000S HF
	400	AP3002	200	AP4540	250	AP1900S HF	150	AP/AZ/AK1400TS		
		AP3650		AP4650		350		AP2700	250	AP/AZ/AK1200S
	1000	AP3130	1000	AP3700	1000	AP/AZ/AK1200S HR	300	AP/AZ/AK1200S HF		
AP3125		AP3800							AZ/AK1300S	
									400	AP/AZ/AK1200S FC
Nitrogen Trifluoride (NF ₃)	75	AP3000	60	AP3540	5	AP/AZ1500S	6	AP/AZ1000S		
		AP3650		AP3650		60		AP/AZ1400TS	15	AP/AZ1000S HF
	100	AP3002	110	AP4540	150	AP/AZ1400TS	30	AP/AZ1400TS		
		AP3650		AP4650					75	AP/AZ1200S
	350	AP3130	500	AP3700	400	AP/AZ1200S HR	125	AP/AZ1200S HF		
		AP3125		AP3800						AZ1300S
										250
				1000	①AP9030	600	AP9100S			
					②AP9110		AP9100S			

AP
SL
AZ
AK
BP

■ denotes heating required to achieve stated flow.
Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

Recommended Model Selection Table

Please read page 656 before selecting a product.

Application Process Gas	Valve				Regulator				
	Source applications		Distribution applications		Source applications		Distribution applications		
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	
Nitric Oxide (NO)	310	AP3000	75	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF	
	380	AP3002	125	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS	
		AP3650		AP4650			75	AP/AZ/AK1200S	
Nitrous Oxide (N ₂ O)	300	AP3000	70	AP3540	3	AP/AZ/AK1500S VS	8	AP/AZ/AK1000S VS	
		AP3650		AP3650	60	AP/AZ/AK1400TS VS	20	AP/AZ/AK1000S VS HF	
	500	AP3002	140	AP4540	100	AP/AZ/AK1200S VS	35	AP/AZ/AK1400TS VS	
		AP3650		AP4650	150	AP/AZ1200S VS HF	85	AP/AZ/AK1200S VS	
	1500	AP3113	750	AP3700	500	① AP/AZ1225S VS	160	AP/AZ/AK1200S VS HF	
		AP3125		AP3800		② AP/AZ1200S VS HF		AZ/AK1300S	
Octafluorocyclopentene (C ₅ F ₈)	15	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	0.3	AP/AZ1101S	
		AP4650		AP4650			5	AP/AZ/AK1402TSA	
Oxygen (O ₂)	250	AP3000	75	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S	
		AP3650		AP3650	80	AP1900S	25	AP/AZ/AK1000S HF	
	400	AP3002	150	AP4540	150	AP1900S HF	50	AP/AZ/AK1400TS	
		AP3650		AP4650	1000	AP/AZ/AK1200S HR	120	AP/AZ/AK1200S	
				1000	AP3700 AP3800			200	AP/AZ/AK1200S HF
								400	AZ/AK1300S
1000								AP/AZ/AK1200S FC	
Perfluorobutadiene (C ₄ F ₆)	25	AP4540	25	AP4540	5	AP/AZ1402TSA	0.5	AP/AZ1101S	
		AP4650		AP4650			5	AP/AZ1402TSA	
Phosphine (PH ₃)	320	AP3000	80	AP3540	5	AP/AZ1500S	5	AP/AZ1000S	
		AP3650		AP3650	40	AP/AZ1400TS	10	AP/AZ1000S HF	
	390	AP3002	145	AP4540					
Phosphine Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF	
	225	AP3002	160	AP4540					
Phosphorous Pentafluoride (PF ₅)	15	AP3000	5	AP3540	10	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF	
	19	AP3002	9	AP4540					
		AP3650		AP4650					
41	AP3130	52	AP3700						
Propane (C ₃ H ₈)	65	AP3540	42	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF	
	115	AP4450	75	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS	
		AP4650		AP4650					
Propene (C ₃ H ₆)	185	AP3540	75	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF	
	320	AP4540	125	AP4540			50	AP/AZ/AK1400TS	
Silane (SiH ₄)	150	AP3000	75	AP3540	5	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	40	AP/AZ1400TS	25	AP/AZ1000S HF	
	250	AP3002	150	AP4540	50	AP2700S	50	AP/AZ1400TS	
		AP3650		AP4650	60	AP/AZ1200S	120	AP/AZ1200S	
	600	AP3130	750	AP3700	100	AP/AZ1200S HF	200	AP/AZ1200S HF	
		AP3125		AP3800	500	① AP/AZ1225S VS	400	AZ1300S	
							② AP/AZ1200S HF		
Silane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF	
	225	AP3002	160	AP4540	40	AP/AZ1400TS	40	AP/AZ1400TS	
		AP3650		AP4650					
Silicon Tetrachloride (SiCl ₄)	10	AP4540	10	AP4540	5	AP/AZ1402TSA	0.5	AP/AZ1101S	
		AP4650		AP4650			5	AP/AZ1402TSA	

■ denotes heating required to achieve stated flow.
Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

Recommended Model Selection Table

Please read page 656 before selecting a product.

Application Process Gas	Valve				Regulator				
	Source applications		Distribution applications		Source applications		Distribution applications		
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	
Silicon Tetrafluoride (SiF ₄)	95	AP3000	45	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S	
		AP3650		AP3650	40	AP/AZ/AK1400TS		20	AP/AZ/AK1000S HF
	115	AP3002	80	AP4540			40	AP/AZ/AK1400TS	
		AP3650		AP4650					
Sulfur Dioxide (SO ₂)	80	AP4540	30	AP4540	1	AP/AZ/AK1000S	6	AP/AZ/AK1402TSA	
		AP4650		AP4650	6	AP/AZ/AK1402TSA			
Sulfur Hexafluoride (SF ₆)	125	AP3000	35	AP3540	3	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	40	AP/AZ/AK1400TS		12	AP/AZ/AK1000S HF
	200	AP3000	75	AP4540	60	AP/AZ/AK1200S	60	AP/AZ/AK1200S	
		AP3650		AP4650	150	AP/AZ/AK1200S HF		90	AP/AZ/AK1200S HF
	500	AP3113	400	AP3700	500	AP9100S	400	AZ/AK1300S	
		AP3125		AP3800				180	AP/AZ/AK1200S FC
Sulfur Tetrafluoride (SF ₄)	200	AP4540	80	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP4650		AP4650	15	AP/AZ/AK1400TS		5	AP/AZ/AK1000S HF
								15	AP/AZ/AK1400TS
Trichlorosilane (SiHCl ₃)	35	AP4540	30	AP4540	10	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S	
		AP4650		AP4650				10	AP/AZ/AK1402TSA
Trimethylsilane ((CH ₃) ₃ SiH)	30	AP4540	25	AP4540	7	AP/AZ/AK1402TSA	0.5	AP/AZ1101S	
		AP4650		AP4650				7	AP/AZ/AK1402TSA
Tungsten Hexafluoride (WF ₆)	10	AP4540	10	AP4540	5	AP/AZ/AK1402TSA	0.3	AP/AZ/AK1101SH	
		AP4650		AP4650				5	AP/AZ/AK1402TSA
Xenon (Xe)	85	AP3000	40	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	25	AP/AZ/AK1400TS		10	AP/AZ/AK1000S HF
	100	AP3002	70	AP4540			25	AP/AZ/AK1400TS	
		AP3650		AP4650					

■ denotes heating required to achieve stated flow. Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

AP

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Diaphragm Valves

Series

Page

● For ultra high purity (UHP)

Air operated type

Diaphragm Valves: Air operated type (For low pressure) —————	AP3500	P.758
Diaphragm Valves: Air operated type (For low pressure) —————	AP4500	P.760
Diaphragm Valves: Air operated type (For high pressure) —————	AP3000	P.762
Diaphragm Valves: Air operated type (For high pressure and high flow) –	AP3130 & 3113	P.764
Diaphragm Valves: Air operated type (For high flow) —————	AP3700	P.766
Diaphragm Valves: Air operated type / Two Step —————	AP3571 & 4571	P.768
Diaphragm Valves: Air operated type (Metal seated) —————	AP3200	P.770

Manually operated type

Diaphragm Valves: Manually operated type —————	AP3600	P.772
Diaphragm Valves: Manually operated type —————	AP4600	P.774
Diaphragm Valves: Manually operated type (For high pressure and high flow) –	AP3100	P.776
Diaphragm Valves: Manually operated type (For high flow) —————	AP3800 & 3900	P.778
Diaphragm Valves: Manually operated type (Metal seated) —————	AP3260	P.780

LOTO Options for Diaphragm Valves	P.782
Diaphragm Valve Porting Guide	P.783
Diaphragm Valve/Specific Product Precautions	P.784

AP

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Diaphragm Valve for Ultra High Purity

Air operated type
(For low pressure)

AP3500 Series

- Suitable for UHP gas supply line
- Body material : 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- LOTO option available as an option (AP3540)
- Indicator switch available as an option (AP3550)



RoHS

How to Order

AP 3 540 S 2PW FV4 FV4

Size

Code	Cv
3	0.29

Model

Code	Status	Maximum operating pressure
540	Normally closed (N.C.)	150 psig (1.0 MPa)
550		300 psig (2.1 MPa)
580	Normally open (N.O.)	250 psig (1.7 MPa)

Material

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available. Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Option (AP3550 only)

Code	Specification
No code	—
IPC	N.C. Indicator switch *3)
IPO	N.O. Indicator switch *4)

*3) Indication of closed status.
*4) Indication of opened status.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

*2) Not available with H material.

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

*1) Only applies to S material with TW4 connections.

Specifications

Operating Parameters	AP3540	AP3550	AP3580
Status	Normally closed (N.C.)		Normally open (N.O.)
Gas	Select compatible materials of construction for the gas		
Operating pressure	Vacuum to 150 psig (1.0 MPa) *1)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure		
Burst pressure	3 times the maximum operating pressure		
Ambient and operating temperature	-10 to 71°C (No freezing) *2)		
Cv	0.29		
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s	
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *3)	
Across the seat leak	1 x 10 ⁻¹⁰ Pa·m ³ /s		
Surface finish	Ra max 15 µin. (0.4 µm)	Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)	
Connections	Face seal, Tube weld		
Actuation pressure	70 to 110 psig (0.48 to 0.76 MPa)		
Actuation port connection	NPT 1/8 inch	10-32 UNF thread	NPT 1/8 inch
Actuation port location	Top	Side (360° rotatable)	Top
Installation	Bottom mount		
Internal volume	0.06 in ³ (1.07 cm ³)		
Weight	0.68 kg *4)	0.82 kg *4)	0.68 kg *4)
LOTO (Lockout)	Option (Part number: AP PL 210) *5)		N/A

*1) Vacuum to 125 psig (0.9 MPa) for Polyimide seat.

*2) Max. 90°C for Polyimide seat. High temperature available. Please contact SMC.

*3) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

*4) Weight, including individual boxed weight, may vary depending on connections or options.

*5) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed).	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

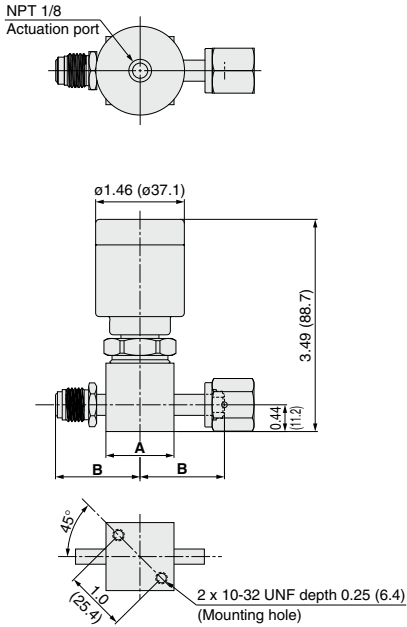
Diaphragm Valve for Ultra High Purity **AP3500 Series**

Air operated type (For low pressure)

Dimensions

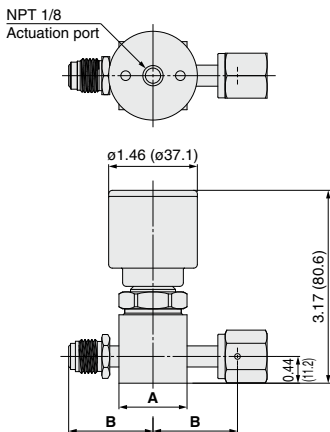
inch (mm)

AP3540

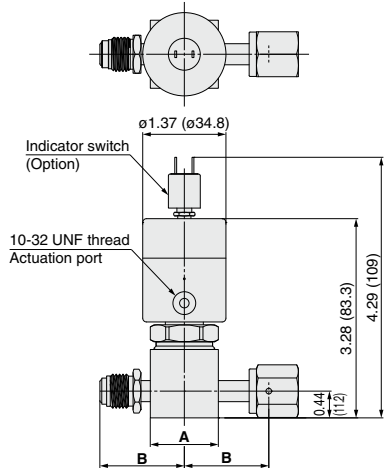


Bottom view

AP3580



AP3550



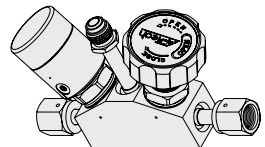
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)
H	FV4	1.25 dia. *)	(ø31.8)	1.45	(36.8)
	MV4			1.08	(27.4)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)

*) Ni-Cr-Mo alloy valve body is round not square.

Made to Order

Made to Order

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Diaphragm Valve for Ultra High Purity

Air operated type
(For low pressure)

AP4500 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- LOTO option available as an option (AP4540)
- Indicator switch available as an option (AP4550)



RoHS

How to Order

AP 4 540 S 2PW FV6 FV6

Size

Code	Cv
4	0.5

Model

Code	Status	Maximum operating pressure
540	Normally closed (N.C.)	125 psig (0.9 MPa)
550		300 psig (2.1 MPa)
580	Normally open (N.O.)	250 psig (1.7 MPa)

Material

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available. Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Option (AP4550 only)

Code	Specification
No code	—
IPC	N.C. indicator switch *3)
IPO	N.O. indicator switch *4)

*3) Indication of closed status.
*4) Indication of opened status.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

*2) Not available with H material.

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

*1) Only applies to S material with TW4 connections.

Specifications

Operating Parameters	AP4540	AP4550	AP4580
Status	Normally closed (N.C.)		Normally open (N.O.)
Gas	Select compatible materials of construction for the gas		
Operating pressure	Vacuum to 125 psig (0.9 MPa)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure		
Burst pressure	3 times the maximum operating pressure		
Ambient and operating temperature	-10 to 71°C (No freezing) *1)		
Cv	0.5		
Leak rate	2 x 10 ⁻¹¹ Pa·m ³ /s		
Inboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *2)		
Outboard leakage	1 x 10 ⁻¹⁰ Pa·m ³ /s		
Across the seat leak	Face seal, Tube weld		
Surface finish	Ra max 15 µin. (0.4 µm)	Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)	
Connections	70 to 110 psig (0.48 to 0.76 MPa)		
Actuation pressure	NPT 1/8 inch		
Actuation port connection	10-32 UNF thread	NPT 1/8 inch	
Actuation port location	Top	Side (360° rotatable)	Top
Installation	Bottom mount		
Internal volume	0.06 in ³ (1.07 cm ³)		
Weight	0.68 kg *3)	0.82 kg *3)	0.68 kg *3)
LOTO (Lockout)	Option (Part number: AP PL 210) *4)		N/A

*1) Max. 90°C for Polyimide seat. High temperature available. Please contact SMC.

*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

*3) Weight, including individual boxed weight, may vary depending on connections or options.

*4) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m / PVC cable 2 cores, 3 m	
Wiring diagram		

Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

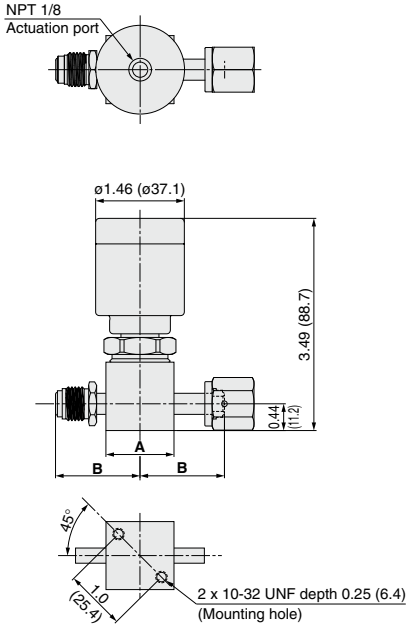
Diaphragm Valve for Ultra High Purity **AP4500 Series**

Air operated type (For low pressure)

Dimensions

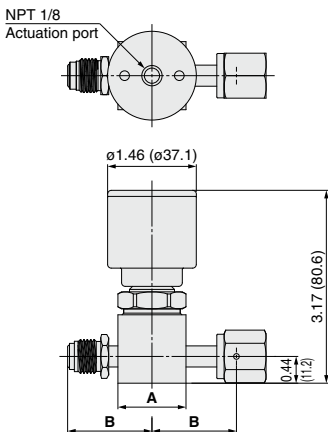
inch (mm)

AP4540

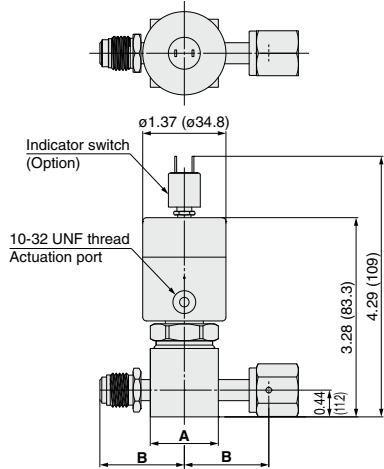


Bottom view

AP4580



AP4550



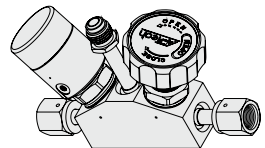
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	$(\square 28.4)$	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	MV6			1.325	(33.7)
	TW6			1.45	(36.8)
H	FV4	1.25 dia. *)	$(\phi 31.8)$	1.08	(27.4)
	MV4			1.93	(49.0)
	TW4			1.325	(33.7)
	MV6			1.325	(33.7)

*) Ni-Cr-Mo alloy valve body is round not square.

Made to Order

Made to Order

Products such as three port dual valves can be made with monoblock configuration. Please contact SMC for details.



Diaphragm Valve for Ultra High Purity

Air operated type
(For high pressure)

AP3000 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed
- High pressure type: Max. 3000 psig (20.7 MPa)
- LOTO option available as an option
- Indicator switch available as an option



ROHS

How to Order

(Inlet) (Outlet)

AP30 00 S 2PW FV4 FV4

Model

Code	Cv
00	0.23
02	0.28

Material

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available. Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Option

Code	Specification
No code	—
IS	Indicator switch *3)

*3) Indication of opened/closed status.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

*2) Not available with H material.

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

*1) Only applies to S material with TW4 connections.

Specifications

Operating Parameters		AP3000	AP3002
Status		Normally closed (N.C.)	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 3000 psig (20.7 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-10 to 71°C (No freezing)	
Cv		0.23	0.28
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s	
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *1)	
Across the seat leak		1 x 10 ⁻¹⁰ Pa·m ³ /s	
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
Connections		Face seal, Tube weld	
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection		NPT 1/8 inch	
Actuation port location		Top	
Installation		Bottom mount	
Internal volume		0.06 in ³ (1.07 cm ³)	
Weight		1.27 kg *2)	
LOTO (Lockout)		Option (Part number: AP PL 210) *3)	

*1) Tested with Helium gas inlet pressure 1000 psig (6.9 MPa).

*2) Weight, including individual boxed weight, may vary depending on connections or options.

*3) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	IS
Switch type	SPDT
Rated voltage	Max. 30 VDC
Contact capacity	Max. 3 VA
Switching current	Max. 0.2 A
Carrying current	Max. 0.5 A
Cable	Lead wire
	Cable length
	Color (Lead wire)

AWG 24
3 m
Blue: Common line
Brown: NC (When the valve is closed, the circuit is closed.)
Black: NO (When the valve is open, the circuit is closed.)

Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

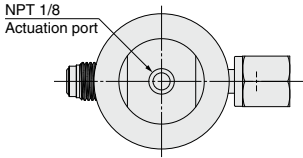
Diaphragm Valve for Ultra High Purity **AP3000 Series**

Air operated type (For high pressure)

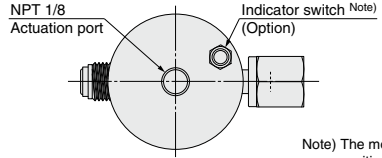
Dimensions

inch (mm)

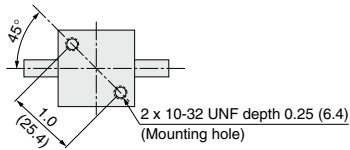
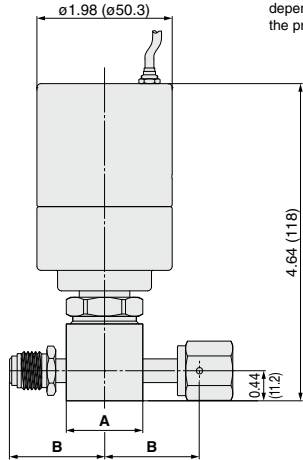
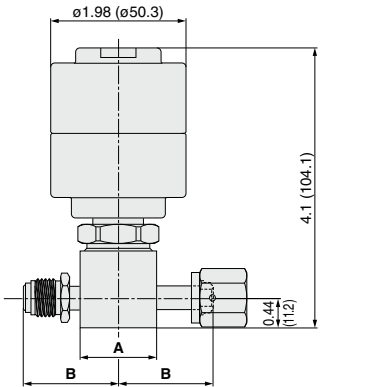
AP3000



Indicator switch



Note) The mounting position varies depending on the product.



Bottom view

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	□28.4	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.45	(36.8)
	TW6			1.08	(27.4)
H	FV4	1.25 dia. *)	ø(31.8)	1.93	(49.0)
	MV4			1.325	(33.7)
	TW4			1.45	(36.8)
	FV6			1.08	(27.4)
	MV6			1.93	(49.0)
	TW6			1.325	(33.7)

*) Ni-Cr-Mo alloy valve body is round not square.

AP

SL

AZ

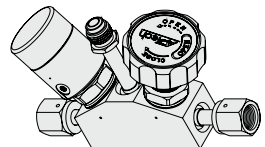
AK

BP



Made to Order

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Diaphragm Valve for Ultra High Purity

Air operated type
(For high pressure and high flow)

AP3130 & 3113 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed
- High pressure type: 20.7 MPa and 9 MPa
- Designed for bulk specialty gas (BSGS) delivery
- LOTO option available as an option



ROHS

How to Order

Model: **AP31 30 S** **2PW** **MV8** **MV8**

(Inlet) (Outlet)

Code	Maximum operating pressure	Cv
13	1300 psig (9.0 MPa)	1.0
30	3000 psig (20.7 MPa)*1)	0.7

*1) 2400 psig (16.5 MPa) for connection size 3/4 inch.

Material

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy *2)

*2) Special export controls apply to Ni-Cr-Mo alloy body with 1/2 inch or greater size connection.

Surface finish

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)

Ports

Code	Ports
2PW	2 ports

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female) *3)
MV12	3/4 inch face seal (Male) *3)
TW12	3/4 inch tube weld

*3) Prepare a suitable mating fitting with a rated pressure.

Option

Code	Specification
No code	—
IS	Indicator switch *5)

*5) Indication of opened/closed status.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *4)

*4) Not available with H material.

Specifications

Operating Parameters		AP3113	AP3130
Status		Normally closed (N.C.)	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 1300 psig (9.0 MPa)	Vacuum to 3000 psig (20.7 MPa)
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-10 to 65°C (No freezing)	
Cv *1)		1.0	0.7
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s	
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *2)	
Across the seat leak		1 x 10 ⁻¹⁰ Pa·m ³ /s	
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm)	
Connections		Face seal, Tube weld	
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection		NPT 1/8 inch	
Actuation port location		Top	
Installation		Bottom mount	
Internal volume		0.36 in ³ (6.0 cm ³) for body	
Weight		1.27 kg *3)	
LOTO (Lockout)		Option (Part number: AP PL 210) *4)	

*1) Figure of 1/2 inch connection.

*2) Tested with Helium gas inlet pressure 500 psig (3.5 MPa).

*3) Weight, including individual boxed weight, may vary depending on connections or options.

*4) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	IS	
Switch type	SPDT	
Rated voltage	Max. 30 VDC	
Contact capacity	Max. 3 VA	
Switching current	Max. 0.2 A	
Carrying current	Max. 0.5 A	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Spring	316L SS	Ni-Cr-Fe alloy
Diaphragm	Ni-Co alloy	
Poppet	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

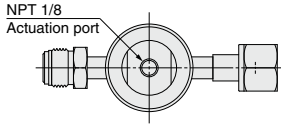
Diaphragm Valve for Ultra High Purity **AP3130 & 3113 Series**

Air operated type (For high pressure and high flow)

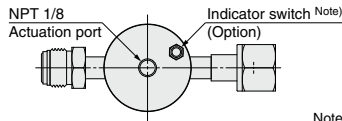
Dimensions

inch (mm)

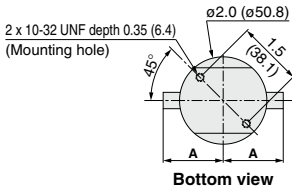
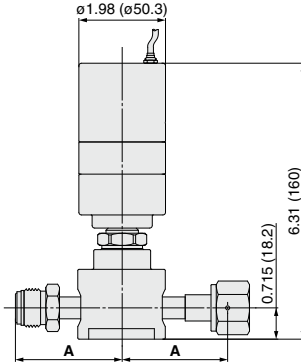
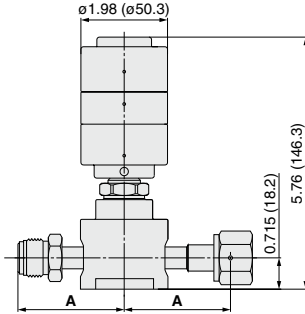
AP3113



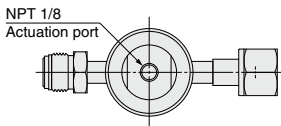
Indicator switch



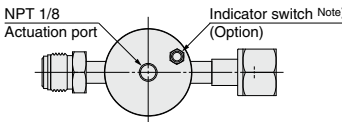
Note) The mounting position varies depending on the product.



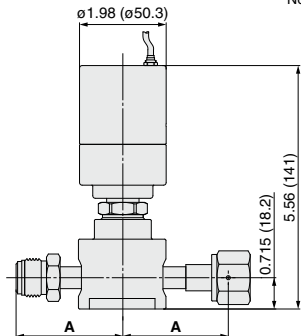
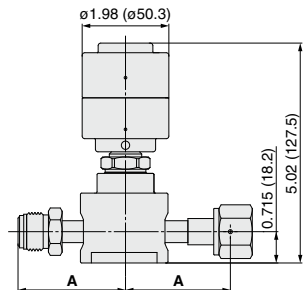
AP3130



Indicator switch



Note) The mounting position varies depending on the product.



Connections	A	
	inch	(mm)
FV4	2.00	(50.8)
MV4	2.00	(50.8)
TW6	1.375	(34.9)
FV8	2.425	(61.6)
MV8	2.425	(61.6)
TW8	1.79	(45.4)
FV12	3.50	(88.9)
MV12	3.50	(88.9)
TW12	3.25	(82.6)

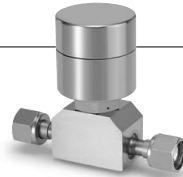
- AP
- SL
- AZ
- AK
- BP

Diaphragm Valve for Ultra High Purity

Air operated type
(For high flow)

AP3700 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- Purge ports and monoblock configurations available



RoHS

How to Order

(Inlet) (Outlet)

AP37 00 S **MV8** **MV8** **00**

Model

Code	Status
00	Normally closed (N.C.)
08	Normally open (N.O.)

Material

Code	Body material
S	316L SS secondary remelt

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Option (AP3700 Only)

Code	Specification
No code	—
IPC	N.C. indicator switch *2)
IPO	N.O. indicator switch *3)

*2) Indication of closed status.
*3) Indication of opened status.

Purge port option

Code	Specification
No code	—
C	Capped purge port

Seat material

Code	Material
No code	PTCFE (Standard)
VS	Polyimide

Purge port *1)

Code	Inlet ③	Outlet ④
00	None	None
M0	Available	None
0B	None	Available
MB	Available	Available

Porting Configuration

Connections (Inlet ①, Outlet ②)

Code	Connections
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

Specifications

Operating Parameters	AP3700	AP3708
Status	Normally closed (N.C.)	Normally open (N.O.)
Gas	Select compatible materials of construction for the gas	
Operating pressure	Vacuum to 250 psig (1.7 MPa)	
Proof pressure	1.5 times the maximum operating pressure	
Burst pressure	3 times the maximum operating pressure	
Ambient and operating temperature	-10 to 71°C (No freezing)	
Cv	2.8	
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *1)
Across the seat leak	1 x 10 ⁻¹⁰ Pa·m ³ /s	
Surface finish	Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)	
Connections	Face seal, Tube weld	
Actuation pressure	80 to 100 psig (0.55 to 0.7 MPa)	
Actuation port connection	10-32 UNF thread	
Actuation port location	Side (360° rotatable)	
Installation	Bottom mount	
Internal volume	0.76 in ³ (12.52 cm ³)	
Weight	1.54 kg *2)	

*1) 1/4 inch face seal (Male) as standard.

*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

*2) Weight, including individual boxed weight, may vary depending on connections or options.

Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

Diaphragm Valve for Ultra High Purity **AP3700 Series**

Air operated type (For high flow)

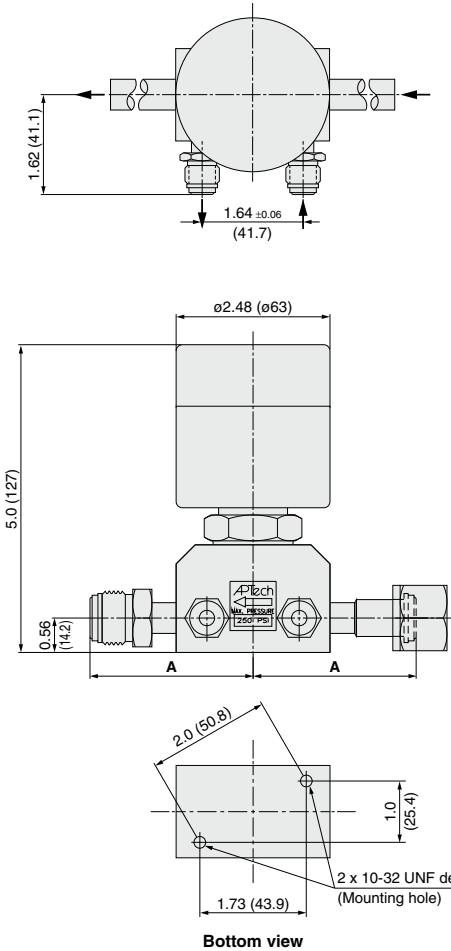
Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	316L SS
Seat	PCTFE (Option: Polyimide)

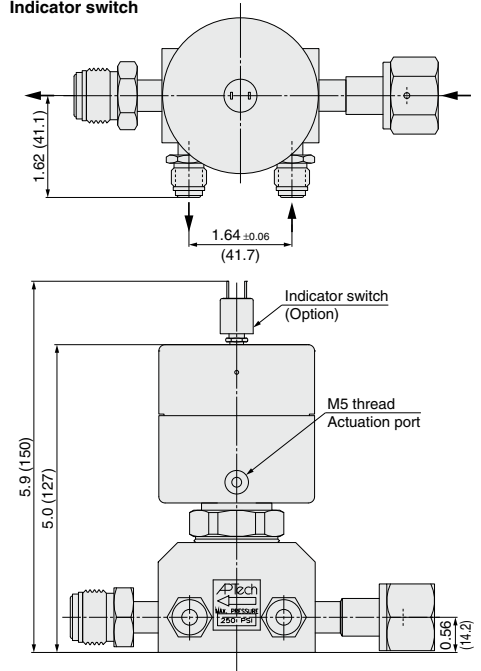
Dimensions

inch (mm)

AP3700



Indicator switch



AP

SL

AZ

AK

BP

Connections	A	
	inch	(mm)
TW6	4.25	(108.0)
FV8	2.65	(67.3)
MV8	2.65	(67.3)
TW8	4.25	(108.0)
FV12	3.20	(81.3)
MV12	3.20	(81.3)
TW12	4.25	(108.0)

Made to Order

Made to Order

Change of porting configuration and products such as three port dual valves can be made. Please contact SMC for details.

Diaphragm Valve for Ultra High Purity

Air operated type
Two Step

AP3571 & 4571 Series

- Two step mode - metered flow and full open
- Two separate actuation ports
- Soft start valve to minimize vacuum chamber pressurization turbulence
- Metered flow adjustable AP3571: 10 to 200 slpm*
AP4571: 10 to 350 slpm*
- Pneumatically actuated normally closed
- Body material: 316L SS secondary remelt

* At 80 psig (0.55 MPa) of N₂



ROHS

How to Order

(Inlet) (Outlet)

AP 3 571 S 2PW FV4 FV4 M 050

Size

Code	Cv
3	0.29
4	0.5

Model

Code	Mode	Status
571	Two step mode	Normally closed (N.C.)

Material

Code	Body material
S	316L SS secondary remelt

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available. Please refer to page 783.

Metered flow

Code	Metered adjusted flow in slpm
XXX (3 digits)	Metered adjusted flow in slpm at 80 psig (0.55 MPa) N ₂ . Replace XXX with flow rate using 3 digits, example 50 slpm = "050" Adjustable range: AP3571= 10 to 200 slpm AP4571= 10 to 350 slpm

Face to face dimension ^{*2)}

Code	Face to face
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

*2) Only applies to S material with TW4 connections.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld *1)
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

*1) TW4 is not available with AP4571

Specifications

Operating Parameters		AP3571	AP4571
Status		Normally closed (N.C.)	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 125 psig (0.9 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		0 to 51°C (No freezing)	
Cv		0.29	0.5
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s	
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *1)	
Across the seat leak		1 x 10 ⁻¹⁰ Pa·m ³ /s	
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)	
Connections		Face seal, Tube weld	
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection		M5 thread (2 each)	
Actuation port location		Sides (2 each)	
Installation		Bottom mount	
Internal volume		0.06 in ³ (1.07 cm ³)	
Adjustable range of metered flow ^{*2)}		10 to 200 slpm	10 to 350 slpm
Tolerance of ^{*2)} metered flow	10 to 20 slpm	±6 slpm	
	21 to 50 slpm	±10 slpm	
	51 to 100 slpm	±15 slpm	
	101 to 200 slpm	±20 slpm	
	201 to 350 slpm	N/A	±25 slpm

*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa)

*2) At 80 psig (0.55 MPa) N₂

Diaphragm Valve for Ultra High Purity **AP3571 & 4571 Series**

Air operated type (Two Step)

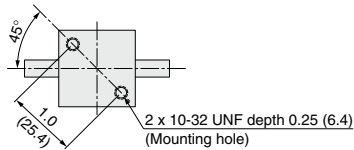
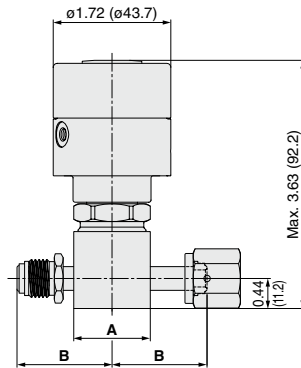
Wetted Parts Material

Wetted parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE

Dimensions

inch (mm)

AP3571 & 4571



AP

SL

AZ

AK

BP

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq. ($\square 28.4$)		1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				
	TW6				

Diaphragm Valve for Ultra High Purity

Air operated type
(Metal seated)

AP3200 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- All metal wetted parts
- Pneumatically actuated normally closed
- Indicator switch available as an option



ROHS

How to Order

(Inlet) (Outlet)

AP32 00 S **2PW** **MV4** **MV4**

Air operated

Material

Code	Body material
S	316L SS secondary remelt

Surface finish

Code	Surface finish Ra max
No code	15 μm. (0.4 μm) Standard
M	10 μm. (0.25 μm)
V	7 μm. (0.18 μm)
X	5 μm. (0.13 μm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available.
Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Option

Code	Specification
No code	—
IS	Indicator switch *2)

*2) Indication of opened/closed status

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

*1) Only applies to TW4 connections.

Specifications

Operating Parameters		AP3200
Status		Normally closed (N.C.)
Gas		Select compatible materials of construction for the gas
Operating pressure		Vacuum to 125 psig (0.9 MPa)
Proof pressure		1.5 times the maximum operating pressure
Burst pressure		3 times the maximum operating pressure
Ambient and operating temperature		-10 to 100°C (No freezing)
Cv		0.27
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *1)
Across the seat leak		1 x 10 ⁻⁷ Pa·m ³ /s *1)
Surface finish	Ra max 15 μm. (0.4 μm)	Option: 10 μm. (0.25 μm), 7 μm. (0.18 μm), 5 μm. (0.13 μm)
Connections		Face seal, Tube weld
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)
Actuation port connection		NPT 1/8 inch
Actuation port location		Top
Installation		Bottom mount
Internal volume		0.06 in ³ (1.07 cm ³)
Weight		1.27 kg *2)

*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

*2) Weight, including individual boxed weight, may vary depending on connections or options.

Indicator Switch (Option) Specification

Code	IS	
Switch type	SPDT	
Rated voltage	Max. 30 VDC	
Contact capacity	Max. 3 VA	
Switching current	Max. 0.2 A	
Carrying current	Max. 0.5 A	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy

Diaphragm Valve for Ultra High Purity **AP3200 Series**

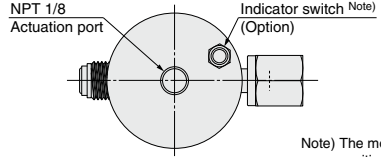
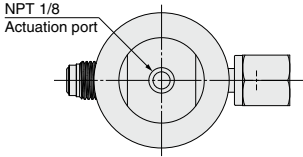
Air operated type (Metal seated)

Dimensions

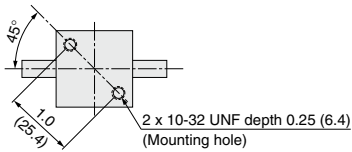
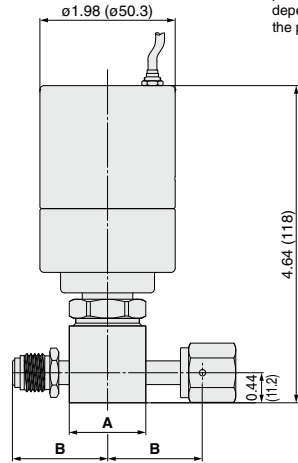
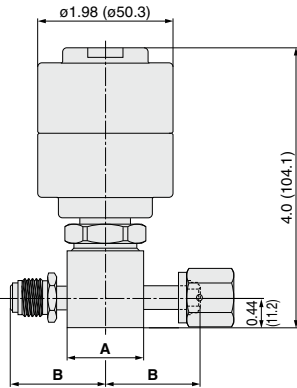
inch (mm)

AP3200

Indicator switch



Note) The mounting position varies depending on the product.



AP

SL

AZ

AK

BP

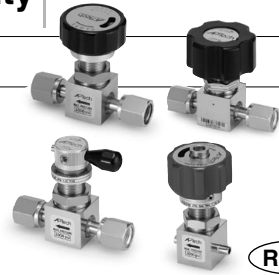
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				
	TW6				

Diaphragm Valve for Ultra High Purity

Manually operated type

AP3600 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- LOTO standard with AP3657, optional AP3625
- Indicator switch available as an option (AP3650)



ROHS

How to Order

(Inlet) (Outlet)

AP 3 650 S 2PW FV4 FV4

Size

Code	Cv
3	0.29

Model

Code	Knob
600	Multi turn round knob
625	1/4 turn lever knob
650	1/4 turn round knob with open/close indication window
657	Pull twist knob with LOTO

Material

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available. Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

Option (AP3650 only)

Code	Specification
No code	—
ISH	Indicator switch *4)

*4) Indication of opened/closed status.

Installation option

Code	Installation
No code	Bottom mount (Standard)
P	Panel Installation *3)

*3) Panel mounting hole: dia.0.78 inch (19.8 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

*2) Not available with H material.

*1) Only applies to S material with TW4 connections.

Specifications

Operating Parameters	AP3600	AP3625	AP3650	AP3657
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 3000 psig (20.7 MPa)			
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-40 to 71°C (No freezing) *1)			
Cv	0.29			
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s		
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *2)		
Across the seat leak	1 x 10 ⁻¹⁰ Pa·m ³ /s			
Surface finish	Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)			
Connections	Face seal, Tube weld			
Installation	Bottom mount (Option: panel mount)			
Internal volume	0.06 in ³ (1.07 cm ³)			
Weight	0.36 kg *3)	0.45 kg *3)	0.73 kg *3)	0.4 kg *3)
Knob	Multi turn round knob	1/4 turn lever knob *4)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *5)
Operational Safety Device (OSD)	N/A	Option (Part number: AP PL227) *6)	N/A	Standard
LOTO (Lockout)	N/A	Option (Part number: AP PL225) *6)	N/A	Standard

*1) Max. 90°C for Polyimide seat. High temperature available. Please contact SMC.

*2) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

*3) Weight, including individual boxed weight, may vary depending on connections or options.

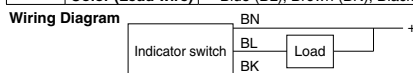
*4) Optional lever color available. Please contact SMC.

*5) Handle must be pulled to turn open from closed.

*6) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	ISH	
Output type	NPN	
Power supply voltage	3.8 to 30 VDC	
Output voltage	Max. 0.4 VDC	
Supply current	Max. 11 mA	
Output current	Max. 20 mA	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue (BL), Brown (BN), Black (BK)



Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

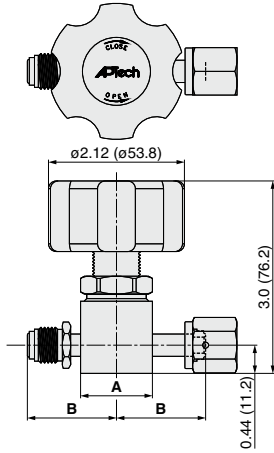
Diaphragm Valve for Ultra High Purity

Manually operated type **AP3600 Series**

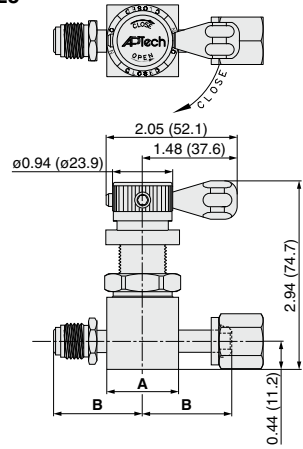
Dimensions

inch (mm)

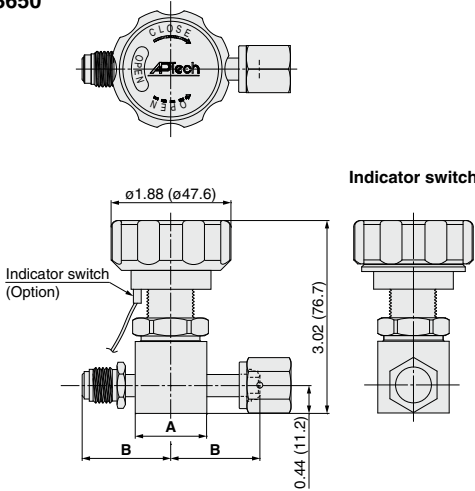
AP3600



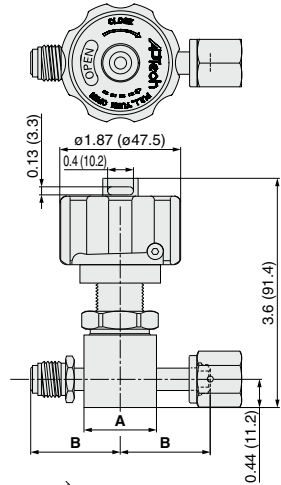
AP3625



AP3650



AP3657

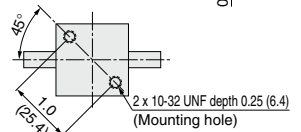
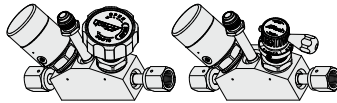


Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	□28.4	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.45	(36.8)
	TW6			1.08	(27.4)
H	FV4	1.25 dia. *)	ø31.8	1.93	(49.0)
	MV4			1.08	(27.4)
	TW4			1.325	(33.7)
	FV6			1.93	(49.0)
	MV6			1.08	(27.4)
	TW6			1.325	(33.7)

*) Ni-Cr-Mo alloy valve body is round not square.

Made to Order

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Bottom view

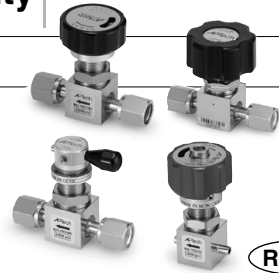
AP
SL
AZ
AK
BP

Diaphragm Valve for Ultra High Purity

Manually operated type

AP4600 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- LOTO standard with AP4657, optional AP4625
- Indicator switch available as an option (AP4650)



How to Order

AP 4 **650** S **2PW** **FV6** **FV6**

Size

Code	Cv
4	0.5

Model

Code	Knob
600	Multi turn round knob
625	1/4 turn lever knob
650	1/4 turn round knob with open/close indication window
657	Pull twist knob with LOTO

Material

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

Ports

Code	Ports
2PW	2 ports

Optional portings and porting configurations available. Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

Option (AP4650 only)

Code	Specification
No code	—
ISH	Indicator switch *4)

*4) Indication of opened/closed status.

Installation option

Code	Installation
No code	Bottom mount (Standard)
P	Panel Installation *3)

*3) Panel mounting hole: dia.0.78 inch (19.8 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

*2) Not available with H material.

*1) Only applies to S material with TW4 connections.

Specifications

Operating Parameters	AP4600	AP4625	AP4650	AP4657
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 300 psig (2.1 MPa)			
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-40 to 71°C (No freezing) *1)			
Cv	0.5			
Leak rate	2 x 10 ⁻¹¹ Pa·m ³ /s			
Inboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *2)			
Outboard leakage	1 x 10 ⁻¹⁰ Pa·m ³ /s			
Across the seat leak	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)			
Surface finish	Face seal, Tube weld			
Connections	Bottom mount (Option: panel mount)			
Installation	0.06 in ³ (1.07 cm ³)			
Internal volume	0.36 kg *3)			
Weight	0.36 kg *3)	0.45 kg *3)	0.73 kg *3)	0.4 kg *3)
Knob	Multi turn round knob	1/4 turn lever knob *4)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *5)
Operational Safety Device (OSD)	N/A	Option (Part number: AP PL227) *6)	N/A	Standard
LOTO (Lockout)	N/A	Option (Part number: AP PL225) *6)	N/A	Standard

*1) Max. 90°C for Polyimide seat. High temperature available. Please contact SMC.

*2) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

*3) Weight, including individual boxed weight, may vary depending on connections or options.

*4) Optional lever color available. Please contact SMC.

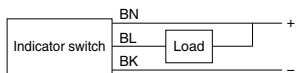
*5) Knob must be pulled to turn open from closed.

*6) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	ISH	
Output type	NPN	
Power supply voltage	3.8 to 30 VDC	
Output voltage	Max. 0.4 VDC	
Supply current	Max. 11 mA	
Output current	Max. 20 mA	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue (BL), Brown (BN), Black (BK)

Wiring Diagram



Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE(Option: Polyimide)	PCTFE



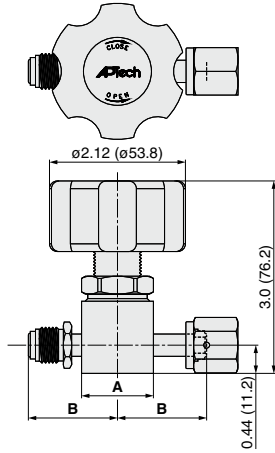
Diaphragm Valve for Ultra High Purity **AP4600 Series**

Manually operated type

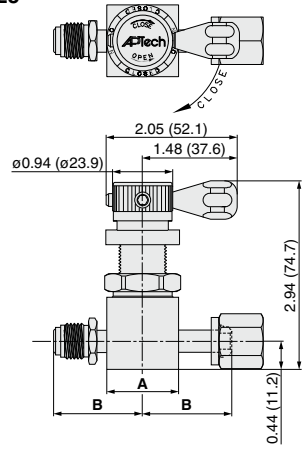
Dimensions

inch (mm)

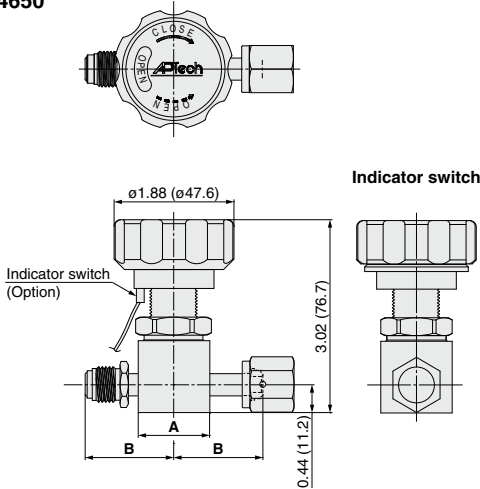
AP4600



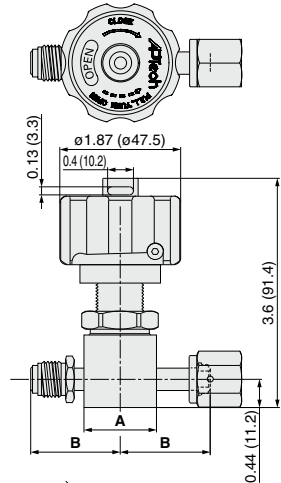
AP4625



AP4650



AP4657

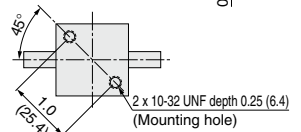
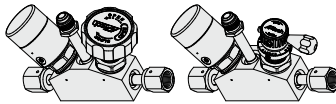


Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	□28.4	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.45	(36.8)
	TW6			1.08	(27.4)
H	FV4	1.25 dia. ^{*)}	○31.8	1.93	(49.0)
	MV4			1.325	(33.7)
	TW4			1.08	(27.4)
	FV6			1.93	(49.0)
	MV6			1.325	(33.7)
	TW6			1.08	(27.4)

*) Ni-Cr-Mo alloy valve body is round not square.

Made to Order

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Bottom view

AP
SL
AZ
AK
BP

Diaphragm Valve for Ultra High Purity

Manually operated type
(For high pressure and high flow)

AP3100 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- High pressure type: 20.7 MPa and 9 MPa
- Designed for bulk specialty gas (BSGS) delivery
- LOTO standard with AP3157, optional AP3125



ROHS

How to Order

AP31 00 S 2PW MV8 MV8

Code	Maximum operating pressure	Cv	Knob
00	3000 psig (20.7 MPa) *1)	0.7	Multi turn round knob
02	1300 psig (9.0 MPa)	1.3	
25	3000 psig (20.7 MPa) *1)	1.0	1/4 turn lever knob
50	1300 psig (9.0 MPa)	1.0	1/4 turn round knob
57	1300 psig (9.0 MPa)	1.0	Pull twist knob with LOTO

*1) 2400 psig (16.5 MPa) for connection size 3/4 inch.

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy *2)

*2) Special export controls apply to Ni-Cr-Mo alloy body with 1/2 inch or greater size connection.

Code	Surface finish
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)

(Inlet) (Outlet)
2PW MV8 MV8

Code	Ports
2PW	2 ports

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female) *3)
MV12	3/4 inch face seal (Male) *3)
TW12	3/4 inch tube weld

*3) Prepare a suitable mating fitting with a rated pressure.

Option (AP3150 only)

Code	Specification
No code	—
ISH	Indicator switch *5)

*5) Indication of opened/closed status.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *4)

*4) Not available with H material.

Specifications

Operating Parameters	AP3100	AP3102	AP3125	AP3150	AP3157
Gas	Select compatible materials of construction for the gas				
Operating pressure	Vacuum to 3000 psig (20.7 MPa)	Vacuum to 1300 psig (9.0 MPa)	Vacuum to 3000 psig (20.7 MPa)	Vacuum to 1300 psig (9.0 MPa)	
Proof pressure	1.5 times the maximum operating pressure				
Burst pressure	3 times the maximum operating pressure				
Ambient and operating temperature	-40 to 65°C (No freezing) *1)				
Cv *2)	0.7	1.3		1.0	
Leak rate	2 x 10 ⁻¹¹ Pa·m ³ /s				
Inboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *3)				
Outboard leakage	1 x 10 ⁻¹⁰ Pa·m ³ /s				
Across the seat leak	Face seal, Tube weld				
Surface finish	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm)				
Connections	Bottom mount				
Installation	0.36 in ³ (6.0 cm ³)				
Internal volume	1.27 kg *4)				
Weight					
Knob	Multi turn round knob (1 1/2 turn)		1/4 turn lever knob *5)	1/4 turn round knob with open/close indication window *6)	Pull twist knob *7)
Operational Safety Device (OSD)	N/A		Option (Part number: AP PL227) *8)	N/A	Standard
LOTO (Lockout)			Option (Part number: AP PL225) *8)		

*1) Max. 90°C for Polyimide seat.

*2) Figure of 1/2 inch connection.

*3) Tested with Helium gas inlet pressure 500 psig (3.5 MPa).

*4) Weight, including individual boxed weight, may vary depending on connections or options.

*5) Optional lever color available. Please contact SMC.

*6) Optional indicator switch available. Please contact SMC.

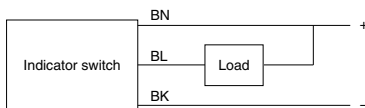
*7) Knob must be pulled to turn open from closed.

*8) Refer to the specification for options. (P.782)

Indicator Switch (Option) Specification

Code	ISH
Output type	NPN
Power supply voltage	3.8 to 30 VDC
Output voltage	Max. 0.4 VDC
Supply current	Max. 11 mA
Output current	Max. 20 mA
Cable	
Lead wire	AWG 24
Cable length	3 m
Color (Lead wire)	Blue (BL), Brown (BN), Black (BK)

Wiring Diagram



Diaphragm Valve for Ultra High Purity **AP3100 Series**

Manually operated type (For high pressure and high flow)

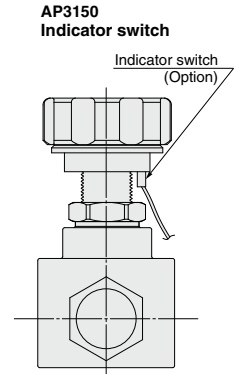
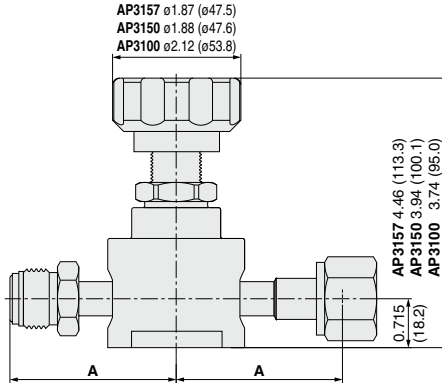
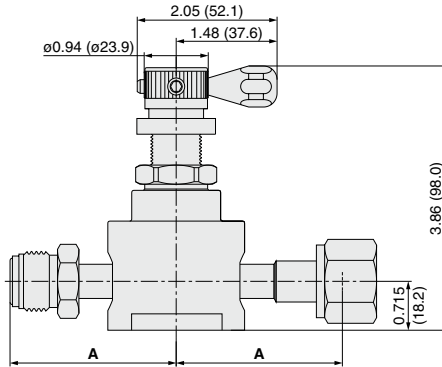
Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Spring	316L SS	Ni-Cr-Fe alloy
Diaphragm	Ni-Co alloy	
Poppet	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

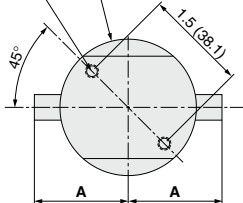
Dimensions

inch (mm)

AP3125



$\phi 2.0$ ($\phi 50.8$)
 2 x 10-32 UNF depth 0.35 (6.4)
 (Mounting hole)



Bottom view

Connections	A	
	inch	(mm)
FV4	2.00	(50.8)
MV4	2.00	(50.8)
TW6	1.375	(34.9)
FV8	2.425	(61.6)
MV8	2.425	(61.6)
TW8	1.79	(45.4)
FV12	3.50	(88.9)
MV12	3.50	(88.9)
TW12	3.25	(82.6)

- AP
- SL
- AZ
- AK
- BP

Diaphragm Valve for Ultra High Purity

Manually operated type
(For high flow)

AP3800 & 3900 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Purge ports and monoblock configurations available
- LOTO available (AP3900)



ROHS

How to Order

AP 3800 S M MV8 MV8 00

(Inlet) (Outlet)

Model	
Code	Knob
3800	Round knob with open/close indication window
3900	Pull twist knob with LOTO

Material	
Code	Body material
S	316L SS secondary remelt

Surface finish	
Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

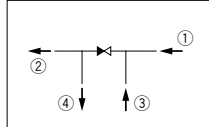
Purge port option	
Code	Specification
No code	—
C	Capped purge port

Seat material	
Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Purge port *1)			
Code	Inlet③	Outlet④	
00	None	None	
M0	Available	None	
0B	None	Available	
MB	Available	Available	

*1) 1/4 inch face seal (Male) as standard.

Porting Configuration



Connections (Inlet①, Outlet②)

Code	Connections
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

Specifications

Operating Parameters		AP3800	AP3900
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 250 psig (1.7 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-40 to 71°C (No freezing)	
Cv		2.8	
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s	
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *1)	
Across the seat leak		1 x 10 ⁻¹⁰ Pa·m ³ /s	
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)	
Connections		Face seal, Tube weld	
Installation		Bottom mount	
Internal volume		0.76 in ³ (12.52 cm ³)	
Weight		1.36 kg *2)	1.45 kg *2)
Knob		Round knob with open/close indication window	Pull twist knob *3)
LOTO (Lockout)		N/A	Standard

*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

*2) Weight, including individual boxed weight, may vary depending on connections or options.

*3) Knob must be pulled to turn open from closed.

Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	316L SS
Seat	PCTFE (Option: Polyimide)

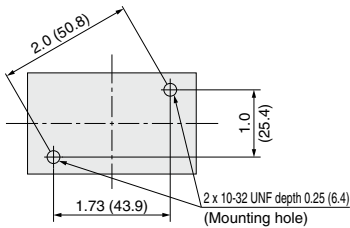
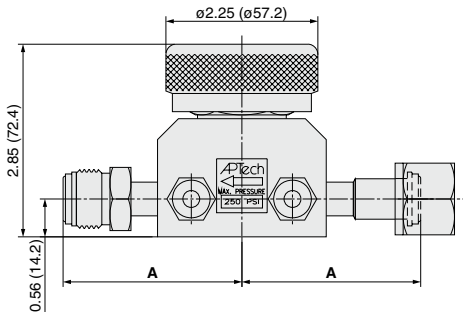
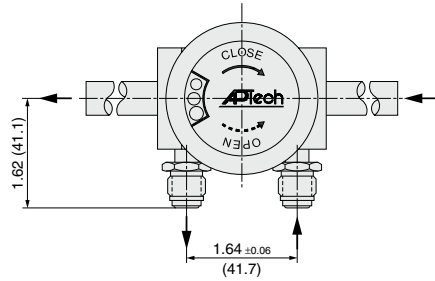
Diaphragm Valve for Ultra High Purity **AP3800 & 3900 Series**

Manually operated type (For high flow)

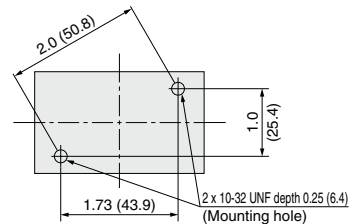
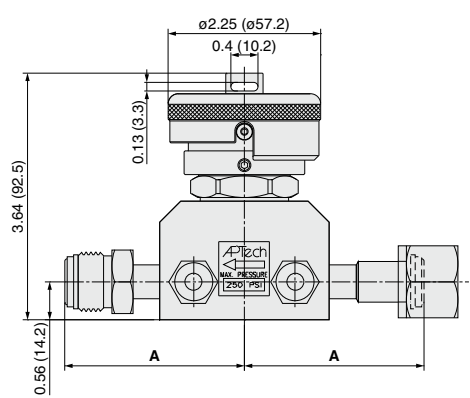
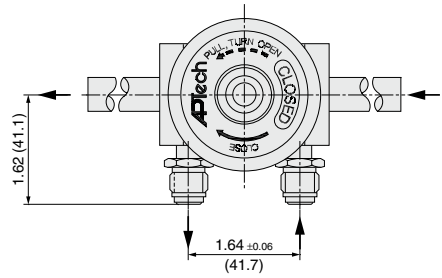
Dimensions

inch (mm)

AP3800



AP3900



Connections	A	
	inch	(mm)
TW6	4.25	(108.0)
FV8		
MV8	2.65	(67.3)
TW8	4.25	(108.0)
FV12		
MV12	3.20	(81.3)
TW12	4.25	(108.0)



Made to Order

Change of porting configuration and products such as three port dual valves can be made. Please contact SMC for details.

- AP
- SL
- AZ
- AK
- BP

Diaphragm Valve for Ultra High Purity

Manually operated type
(Metal seated)

AP3260 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- All metal wetted parts



How to Order

ROHS

(Inlet) (Outlet)

AP32 60 S **2PW** **MV4** **MV4**

Manually operated type •

Material •

Code	Body Material
S	316L SS secondary remelt

Surface finish •

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Installation option

Code	Installation
No code	Bottom mount (Standard)
P	Panel Installation *2)

*2) Panel mounting hole:
dia. 0.78 inch (19.8 mm).

Face to face dimension *1)

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

*1) Only applies to TW4 connections.

Ports •

Code	Ports
2PW	2 ports

Optional portings and porting configurations available.
Please refer to page 783.

Connections (Inlet, Outlet)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Specifications

Operating Parameters		AP3260	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 125 psig (0.9 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-40 to 90°C (No freezing)	
Cv		0.27	
Leak rate	Inboard leakage	2 x 10 ⁻¹¹ Pa·m ³ /s	
	Outboard leakage	2 x 10 ⁻¹⁰ Pa·m ³ /s *1)	
Across the seat leak		1 x 10 ⁻⁷ Pa·m ³ /s *1)	
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)	
Connections		Face seal, Tube weld	
Installation		Bottom mount (Option: panel mount)	
Internal volume		0.06 in ³ (1.07 cm ³)	
Weight		0.36 kg *2)	
Knob		Multi turn round knob	

*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

*2) Weight, including individual boxed weight, may vary depending on connections or options.

Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy

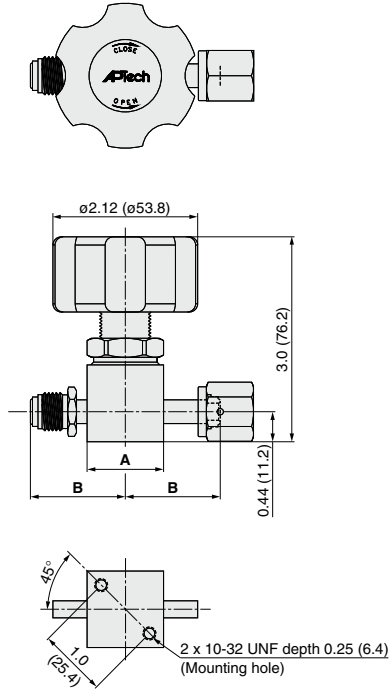
Diaphragm Valve for Ultra High Purity **AP3260 Series**

Manually operated type (Metal seated)

Dimensions

inch (mm)

AP3260



- AP
- SL
- AZ
- AK
- BP

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				
	TW6				

LOTO Options for Diaphragm Valves

* Made to order specifications

Lockout Device/For Air Operated Valve (Order Separately)

Product number: AP PL210

Feature

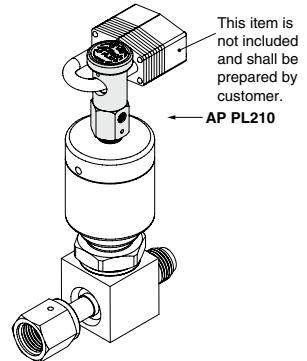
- Lockable by installing the AP PL210 to the actuation port of air operated valve (only available for N.C. with actuation port connection NPT 1/8 inch)
- Prevent accidental valve opening by manually shutting off actuation pressure
- Lockable only in the closed position
- Accept standard pad lock with 1/4 inch shackle
- Actuation port connection: 10-32 UNF thread
- Actuation port pressure rating: Maximum 150 psig (1.0 MPa)

Operation

Push top button down and twist to close the valve. This feature allows the valve to stay in closed position even if actuation pressure is supplied into an actuation port. Valve opens by repositioning the button, then pressurizing the actuation port.

Series

AP3000, AP3113, AP3130, AP3540, AP4540, AP3200



Lockout Device/For Manually Operated Valve (Order Separately)

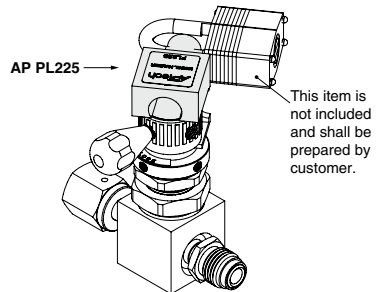
Product number: AP PL225

Feature

- Lockable by installing the AP PL225 to the manually operated valve (only available for lever knob)
- Lockable in the closed position
- Accept standard pad lock with 1/4 inch shackle.

Series

AP3125, AP3625, AP4625



Hook for Operational Safety Device (OSD) (Order Separately)

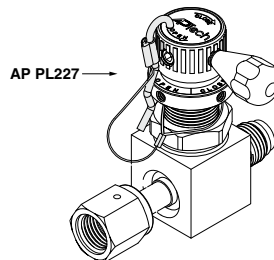
Product number: AP PL227

Feature

- Secure valve in the closed position by installing the AP PL227 to the top of the handle.
- Prevents accidental opening of the valve.

Series

AP3125, AP3625, AP4625



Diaphragm Valve Porting Guide

* Made to order specifications

How to Order

AP 3650 S

Available series

Code	Series
30□□	AP3000 series
32□□	AP3200 series
35□□	AP3500 series
45□□	AP4500 series
36□□	AP3600 series
46□□	AP4600 series

Materials
Stainless steel

Surface finish
Depends on the product series

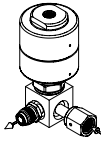
4PWM MV4 TW4 FV4 FV4

Ports

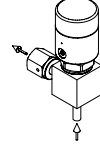
Code	Ports	Configuration
2PW	2 ports	Refer to the following (Port specification)
2PWA		
2PWB		
2PWC		
3PWD	3 ports	Refer to the following (Port specification)
3PWE		
3PWF		
3PWG		
3PWH	4 ports	Refer to the following (Port specification)
3PWJ		
4PWK		
4PWL		
4PWM		
4PWN		

Option
Depends on the product series

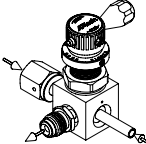
Examples of The Many Available options




AP3000S
2PWC FV4 MV4



AP3550S
2PWB TW4 FV4



AP3625S
3PWD TW4 MV4 FV4



AP3650S
4PWM MV4 TW4 FV4 FV4

AP
SL
AZ
AK
BP

Connections (Number indicates the port location)

Code	Connections
No code	No port
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Port Specifications

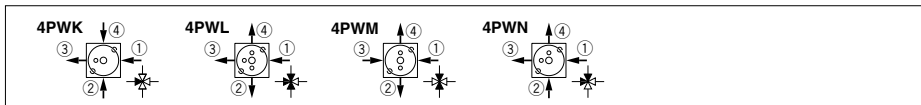
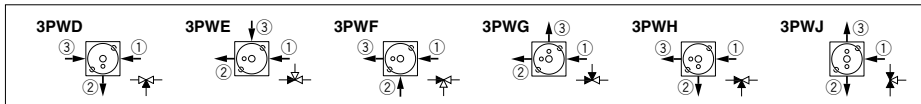
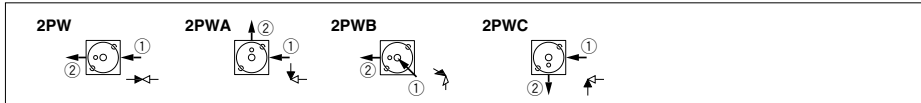
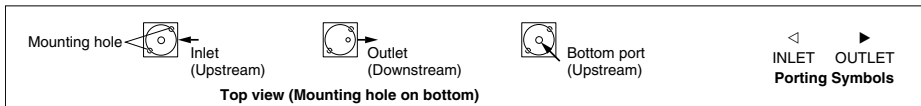
Valves are illustrated top view looking down through the valve.

The traditional flow direction is INLET to OUTLET, but AP Tech valves may be employed in either flow direction.

Port locations are indicated by numbers.

INLET (Upstream) is defined as a port connected to the region below the valve seat. It is illustrated with an arrow pointing towards the valve body or an "empty" triangle on the schematic.

OUTLET (Downstream) is defined as a port connected to the region above the seat and below the diaphragm. It is illustrated with an arrow pointing away from the valve body or a "filled" triangle on the schematic.



2 Ports

3 Ports

4 Ports



Process Gas Equipment/Diaphragm Valve Specific Product Precautions

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 633 and 634 for Process Gas Equipment Precautions.

Selection

Warning

1. Confirm the specifications.

This product is used in gas delivery systems to shutoff gas flow. When selecting the product, confirm the operating conditions, such as type of gas, operating pressure (inlet and outlet), flow rate, actuating pressure, operating temperature etc., and use within the operating range specified in the catalog. The product may not be suitable for use with specific gases and applications/environments. Check the compatibility of the product materials with the process gas. Design the equipment and select the product by understanding the characteristics of gas.

Mounting

Warning

1. Confirm the mounting direction of the product.

Inlet ports are labeled with an "IN" mark. The outlet ports are usually not labeled but may be labeled with an "OUT" mark. Orient the valve as specified by the system designer.

2. Connect actuation pressure to the valve actuator connection. (Air operated type)

Use nitrogen or clean dry air for actuation pressure. The connection may be a 1/8 inch NPT female thread or M5 female thread depending on the valve model.

3. After installation, check internal leakage (leakage across seat) with inert gases.

Perform a helium leak test depending on applications.

Maintenance

Warning

1. If a valve requires repair, contact SMC.

Operation (Air operate type)

Warning

1. Use nitrogen or clean dry air as actuation pressure.

2. Confirm the valve type (N.C. or N.O.).

In the case of N.C. (Normally Closed), valve will open when applying actuation pressure to the valve actuator connection and valve will close when actuation pressure is vented to atmospheric pressure. In the case of N.O. (Normally Open), its actuation mechanism is opposite to the N.C. type. Valve will close when applying actuation pressure to the valve actuator connection.

3. Apply actuation pressure within the range of specifications.

Operation (Manually operated type)

Warning

4. When closing the valve, rotate the handle clockwise until it completely stops.

There is the internal stop in the handle or in the valve body. Rotate the handle clockwise until the internal stop is reached and it completely stops.

5. When closing the valve with LOTO feature, rotate the handle fully clockwise until the stop. (AP3657, AP4657, AP3157, AP3900)

When the handle is fully clockwise, the indicator plate roller is aligned with a vertical slot in the handle allowing the handle to drop downward. This feature prevents the valve from being accidentally opened.

6. When opening the valve, rotate the handle counterclockwise until it completely stops.

There is the internal stop in the handle. Rotate the handle counterclockwise until the internal stop is reached and it completely stops.

7. When opening the valve with LOTO feature, the handle must first be lifted up, away from the valve body, and rotated counterclockwise until it completely stops. (AP3657, AP4657, AP3157, AP3900)

When valve is closed, handle will not rotate as the fixed indicator plate roller is positioned within the vertical slot in the handle. The handle must first be lifted up away from the valve body and rotated counterclockwise until it completely stops.

8. Do not use a tool when rotating the handle.

When the handle is rotated with a tool, it may apply excessive torque to the handle or inside the valve body and it may cause damage. Rotate the handle by hand.

9. When locking the valve with LOTO feature in the closed position, use safety lockout hasp. (AP3657, AP4657, AP3157, AP3900)

The valve with LOTO feature has a built in LOTO capability. When using LOTO feature, rotate the handle clockwise and insert safety lockout hasp into lock stem slot.